

There seems to have been in this new gastropod, a curious specialization of that part of the mantle lying below the suture of the shell and above the first spiral on the base. That part of the mantle not only deposited shell material, but also apparently had a peculiar affinity for mineral grains which were picked up, held in position and cemented firmly in the matrix during periods of shell enlargement.

NEW CUBAN LAND SHELLS FROM ORIENTE AND
CAMAGUEY PROVINCES

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(Concluded from page 108)

OPISTHOSIPHON (OPISTHOSIPHON) ANDREWSI Welch. Pl. 11, fig. 5.

The shell is thin, oblong conic, the suture well impressed, umbilicate, truncate, leaving $3\frac{1}{2}$ convex whorls, nonsolute. The color is cinnamon-buff, but in the paratypes is light pinkish cinnamon, cinnamon or snuff brown. The sculpture consists of hollow axial ribs quite widely spaced, the early whorls being more closely ornamented than the later. Parallel to these ribs are a few thin threads, and in line with these are low crinkly strae, seen only under the microscope, covering the ground. The spiral sculpture is made up of faint regularly set thickenings of the ground appearing strongest on the last whorl; also the bulbular projections at the summit of the ribs on their touching the suture, giving the later a crenulated appearance. About the umbilicus there are three rows of tubercles similar to those about the suture, the outer row is larger than the inner ones. The aperture is oval, the peristome double, the inner portion projects slightly, is narrow and a little indented at the posterior angle; the outer broadly expanded, fluted, coarsely sculptured with radiating ribs. Near the umbilicus it is adnate to the whorl above, at the posterior angle the peristome is deflected backwards on touching the penultimate whorl and ends in a siphon which bends downwards into the suture just back of the aperture. The internal connection of the siphon is just inside the aperture at the posterior margin. The operculum is typical of the genus.

Length 11.8 mm., gr. diam. 8.0 mm., less. diam. 5.4 mm., 19 major ribs. Type.

Length 11.7 mm., gr. diam. 7.8 mm., less. diam. 5.3 mm., 14 major ribs.

Length 11.7 mm., gr. diam. 7.3 mm., less. diam. 5.0 mm., 15 major ribs.

Length 11.5 mm., gr. diam. 7.0 mm., less. diam. 5.3 mm., 19 major ribs.

Length 10.6 mm., gr. diam. 7.2 mm., less. diam. 5.0 mm., 14 major ribs.

Length 10.4 mm., gr. diam. 6.3 mm., less. diam. 4.6 mm., 12 major ribs.

The shell is related to *O. lamellicostatum* Torre and Henderson, but the umbilicus is not closed and it has fewer major ribs. Found on rocks, limestone cliffs and trees by Pilsbry and Welch on the south slope of the Loma de Florencia, Florencia, Cameguy (a part of the Sierra de Jatibonico). The creature was not plentiful, not more than 16 specimens being found on the entire hill. The shell was named after Professor E. A. Andrews of the Johns Hopkins University to whom I owe most of my biological training. Type 148847 A.N.S.P.

OPISTHOSIPHON (OPISTHOSIPHON) TORREI Welch. pl. 11, fig. 6.

The shell is thin, umbilicate, truncate, elongate-conic having 3-4 convex whorls, the last not solute, the suture well impressed. The color is deep brownish drab; in some specimens pale ochraceous buff, pinkish buff, or light pinkish cinnamon, deepening towards the last whorl into wood brown. The sculpture is made up of white, narrow, hollow axial ribs placed at irregular intervals, being closer on the first whorls and more separated towards the aperture. Each rib is enlarged at the summit into a rounded blade-shaped tubercle slightly concave at the left; between some of the ribs and parallel to them appear thin threads; the ground is further cut by crinkly striations parallel to the threads and visible through a microscope. The ground is also roughened by thickenings fairly evenly spaced and arranged so as to spirally sculpture the shell. Along the outer margin of the umbilicus two rows of small blade-like protuberances similar to those about the suture appear on the ribs, these projections grow slightly longer and thicker the farther they go into the umbilicus, the outer row is larger than the

inner. The aperture is ovate, obtusely angled above, the peristome double, an inner peritreme narrow, smooth, slightly projecting, and an outer peritreme broadly expanded, sculptured with fluted concentric laminae. Near the umbilicus there are two grooves or nicks in the lip. The first is anterior and smaller than the second which is directly above the umbilicus; from the last groove the outer peritreme slopes forward to the penultimate whorl to which it is adnate. Over the aperture it forms a delta-shaped projection which is deflected backwards ending in a siphon. The entrance to the siphon from the interior of the shell is just inside the aperture at its posterior angle. The operculum is typical of the genus.

Length 11.4 mm., gr. diam. 7.0 mm., less. diam. 5.1 mm., 30 major ribs. Type 148848.

Length 12.3 mm., gr. diam. 8.9 mm., less. diam. 5.5 mm., 29 major ribs.

Length 11.8 mm., gr. diam. 7.2 mm., less. diam. 5.3 mm., 28 major ribs.

Length 11.4 mm., gr. diam. 7.3 mm., less. diam. 5.5 mm., 32 major ribs.

Length 10.0 mm., gr. diam. 6.0 mm., less. diam. 5.0 mm., 33 major ribs.

Length 9.7 mm., gr. diam. 5.8 mm., less. diam. 4.7 mm., 30 major ribs.

This operculate is intermediate between *O. andrewsi* and *O. lamellicostatum* T. & H. Collected by Pilsbry and Welch, July 11, 1928, on the first hill east of the Chambas River, the western ridge of the Sierra de Cacarratas about one mile from the town of Florencia, Camaguey. The shell was also found on the rocks and trees of the Loma Palma on the opposite side of the river, which is part of the eastern ridge of the Sierra de Jatibonico. Specimens from the type locality although rare, not more than 15 specimens being found, were more numerous than at the Loma Palma, visited by Welch in September, 1929.

OPISTHOSIPHON (OPISTHOSIPHON) CUNAGUAE Welch. Pl. 11, fig. 7.

The shell is ovate conic, truncate consisting of $3\frac{1}{2}$ -4 convex whorls, the sutures are well impressed, the umbilicus is open, the last whorl non-solute. The color is black, but may be brownish drab, pinkish cinnamon, or warm buff. The axial sculpture is made up of fine threads close to-

gether, between and parallel to which the ground is covered with striae seen only with a microscope. There is no spiral sculpture except for the row of hollow tubercles formed by the expansion of certain threads on touching the suture. Within the umbilicus 6-8 pronounced spiral rows of small hollow tubercles similar to those about the suture appear in the form of thickenings of the threads. The shell is further ornamented by bands of dark purple or black dots which are so arranged that they run axially and spirally. The aperture is ovate, obtusely angled above, the peristome is double consisting of a smooth, thin slightly projecting inner peritreme, and an outer one broadly expanded, coarsely sculptured with fluted concentric laminae. Near the umbilicus it is deflected backwards hiding the umbilicus from view, but not sealing it, the outer peritreme then slopes gently to the whorl above to which it is adnate. Above the posterior angle of the aperture the lip expands into a V-shaped depression, deflects backwards into a siphon which projects downwards into the suture behind the aperture. The interior connection of the siphon is found just inside the posterior angle of the aperture. The operculum is typically parachondroid.

The type, 148844 A.N.S.P., a female, measures: Length 12.7 mm., gr. diam. 7.8 mm., less. diam. 6.0 mm.

FEMALES		MALES	
Length	Diameter	Length	Diameter
11.0 mm.	7.5 mm.	9.0 mm.	6.8 mm.
11.4 mm.	7.7 mm.	9.4 mm.	6.7 mm.
11.7 mm.	7.6 mm.	9.8 mm.	6.9 mm.
12.2 mm.	7.9 mm.	10.2 mm.	7.2 mm.
12.6 mm.	8.4 mm.	10.7 mm.	7.1 mm.

Collected by Pilsbry and Welch, July 17, 1928, at Cunagua hill, approached from Colonia Galan, Cunagua, Camegüey province, Cuba. They were found in abundance on rocks and trees, approximately a half a dozen to the square meter. The black forms were by far the most numerous, making up about 95% of the entire number collected.

CHOANOPOMA (ANNULARODES) UNCINATUM INDIVISUM
Welch. Pl. 11, fig. 8.

The shell is oblong conic, truncate leaving 4-4½ convex whorls, umbilicate, non-solute. The color is ivory yellow, shading to chamois on the upper whorl, but may be wood

brown, light buff, or dark vinaceous drab; it is moreover decorated by bands of purplish dots which run axially and yet are so placed that they are also in spiral rows. The axial sculpture is made up of closely set threads. The spiral sculpture is lacking except for the row of hollow tubercles which surrounds the suture at the summit of some of the threads. About the umbilical wall there are 12 rows of small projections similar to those about the suture. The number of rows varies on different specimens from 10-14 rows. The aperture is oval, the peristome double. The inner peritreme is smooth, slightly projecting, thin; the outer is narrowly expanded along the outer margin, increasing in width on nearing the umbilicus where it slopes gently backwards partly covering the umbilicus from view but leaving it wide open. Above the aperture it is adnate to the penultimate whorl, near the posterior angle it is deflected back into a siphon which curves downwards into the suture just behind the aperture. The interior opening of the siphon is just inside the aperture at its posterior margin. The operculum is typical of the genus.

Type, 147880 A.N.S.P., measures: Length 15.3 mm., gr. diam. 8.6 mm., less. diam. 7.0 mm. Paratypes measure, males 11.9 x 7.5 mm., to 13.9 x 8.3 mm.; females from 14.6 x 8.1 mm., to 17.5 x 8.9 mm.

C. uncinatum indivisum differs from its nearest relative *C. uncinatum* Arango in that the last whorl does not become as free from the penultimate whorl, the form is slightly more conic, the siphon is more knob shaped, and less long when measured in a line along the suture. I am indebted to Dr. Paul Bartsch for giving me specimens of Arango's species, which were collected by John B. Henderson. They were from the Loma de Ternero, Santa Clara Province.

Habitat: The south slope of the Loma de Florencia, the hill north of the town of Florencia, Camaguey. Collected by Pilsbry and Welch July 11, 1928, the animals were found in abundance, approximately a dozen to the square meter. Also collected by Welch at the Loma Merino, the Loma Mabua, the Loma Palma, and by the guide David Compagni at the Loma Aguacate and the Loma Marroqui, September, 1929.

CHOANOPOMA (ANNULARODES) PILSBRYI Welch. Pl. 11, fig. 9.

The shell is ovate conic, truncate, having $4\frac{1}{2}$ -5 convex whorls the last is non-solute, the umbilicus is closed. The color of the type is cream-buff, varying in tint, but paratypes are greyish brown, cinnamon buff and dark vinaceous drab. The shells are further colored by army-brown spots ranged spirally or axially; in some specimens the spots appear to be part of axial bands, in others they fade out almost completely leaving an apparently unicolored shell, but on observation under the microscope the spots can be noted. The spiral sculpture is lacking excepting the five spiral cords about the closed umbilicus. The axial sculpture consists of closely spaced threads thickened at the suture into lanceolate tubercles. The aperture is oval, the peristome double. The inner peritreme is smooth, thin, slightly projecting; the outer peritreme coarsely sculptured by irregular crinkly layers, thinly expanded along the outer margin of the lip, but nearing the umbilicus it becomes more expanded and is deflected backwards completely sealing the umbilicus; it is adnate to the penultimate whorl. Above the aperture the lip is bent forward forming a delta-shaped depression, then backwards ending in a curved siphon, disappearing along the suture. The siphon connects with the interior of the shell by a pore found inside the aperture at its posterior margin. Related to *A. uncinatum* Arango but is much larger and has the umbilicus closed.

Type 148846 A.N.S.P., a female, measures: Length 14.5 mm., gr. diam. 9.5 mm., less. diam. 4.6 mm. Paratypes measure, males from 13.6 x 8.2 mm. to 15.2 x 9.0 mm.; females from 15.8 x 9.0 mm. to 18.4 x 9.4 mm.

Habitat: Collected by Pilsbry and Welch on the hill east of the Chambas River, the end of the western ridge of the Sierra de Cacarratas about 1 mile east of Florencia, Camaguey, July 11, 1928. Living on limestone cliffs in fairly large colonies, so that about a half a dozen were found to the square meter.